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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/576,120 | 04/18/2006 | Akio Misaka | 071971-0569 | 7423 |
| 53080 7590 08/21/2009 MCDERMOTT WILL & EMERY LLP 600 13TH STREET, NW WASHINGTON, DC 20005-3096 | | | | |
| EXAMINER | | | | |
| ALAM, RASHID A | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 1795 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 08/21/2009 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/576,120

Applicant(s)

MISAKA, AKIO

Examiner

RASHID ALAM

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 10-19, 30 and 31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 10-19, 30 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S5108)
Paper No(s)/Mail Date 02/10/2009
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The applicant's request for reconsideration filed on 04/27/2009 was received. Claims 1, 5, and 14 were amended. Claims 8, 9, 20-29 were cancelled. Claims 30 and 31 were added.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 1-4, 11-14, 16-19, 30, and 31, rejected under 35 U.S.C. 102(b) as being anticipated by Misaka (WO 02/091079 with English translation US 2004/0029023).

Regarding claims 1-3, 30, and 31, Misaka teaches a photomask with a transparent substrate in which mask enhancers are placed in regions and phase shifters are placed in regions surrounded by light shielding portions having transparent portions in between regions, the first region being the bottom part of figure 52:b, the second region being the part of figure 52:b that is right to the bottom part, and the third region being the top part of figure 52:b, and the transparent region is sandwiched between the second and third regions (see abstract and figures 15B, 44B, 5, 15, and 43 of English translation). Misaka also teaches a varying width of the phase shifters so that the second pattern region has a smaller phase shifter width than the first pattern region and the width of the transparent portion is larger than the a given dimension as well (see

figures 28 and 29 as well as paragraphs 0302, 0113 and 0114 of English translation). With respect to the width of the of the phase shifter of the mask enhancer, a change in size and shape is not patently distinct over the prior art absent persuasive evidence that the particular configuration of the claimed invention is significant. See *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). MPEP 2144.04[R-1].

Regarding claim 4, Misaka teaches a semi-light-shielding-portion is used as a light-shielding portion constituting a mask pattern (see paragraph 0013 and figure 28 of English translation).

Regarding claims 11-14, Misaka teaches a reduced size projection exposure apparatus is used to have the widths of the first and second structures to be between $0.8 \times M \times \lambda/NA$ to $0.8 \times M \times \lambda/NA$, and the width of the first structure to the second structure is smaller (see paragraphs 0008 to 0019 and 0113).

Regarding claim 16-18, Misaka teaches The mask pattern includes a phase shifter that generates a phase difference of 180 degrees and $(150+360 \times n)$ degrees or more and $(210+360 \times n)$ degrees or less, where n =an integer, with respect to the exposure light between the phase shifter and a light-transmitting portion in which the mask pattern is not formed on the transparent substrate (see paragraph 0034).

Regarding claim 19, Misaka teaches a photomask with a transparent substrate in which mask enhancers are placed in regions and phase shifters are placed in regions surrounded by light shielding portions having transparent portions in between regions,

the first region being the bottom part of figure 52:b, the second region being the part of figure 52:b that is right to the bottom part, and the third region being the top part of figure 52:b, and the transparent region is sandwiched between the second and third regions (see abstract and figures 5, 15, and 43 of English translation). Misaka teaches etching, or trenching, the transparent substrate (see paragraph 0038). Misaka also teaches a varying width of the phase shifters so that the second pattern region has a smaller phase shifter width than the first pattern region and the width of the transparent portion is larger than the a given dimension as well (see figures 28 and 29 as well as paragraphs 0302, 0113 and 0114 of English translation). With respect to the width of the of the phase shifter of the mask enhancer, a change in size and shape is not patently distinct over the prior art absent persuasive evidence that the particular configuration of the claimed invention is significant. See *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). MPEP 2144.04[R-1]. Furthermore, Misaka teaches a mask data generation method in which a simulation is performed to carry out the steps of forming phase shifters on a mask (see paragraphs 0352 to 0369).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 5-7, 10, and 15, are rejected under 35 U.S.C. 103(a) as being unpatentable over Misaka (WO 02/091079 with English translation US 2004/0029023), as applied to claims 1-4, 11-14, 16-19, 30 and 31, in view of Ohsaki (US 6,586,168).

Regarding claims 5 and 10, Misaka teaches as stated above. However, Misaka is silent about a fourth and fifth pattern connected to the mask pattern in a continuous pattern.

Ohsaki teaches a mask pattern used for transferring a very fine circuit pattern onto a photosensitive substrate, with a fourth and fifth pattern in a continuous pattern structure (see figures 15B and 15C). Therefore, it would have been obvious to one skilled in the art at the time of the invention to have a mask pattern with five mask pattern structures connected in a continuous mask pattern by Misaka, because Ohsaki teaches a mask pattern used for transferring a very fine circuit pattern onto a photosensitive substrate, with a fourth and fifth pattern in a continuous pattern structure in order to provide an exposure method, an exposure apparatus and/or a device manufacturing method, by which, when a multiple exposure process is to be performed by using plural mask patterns being different in image contrast, every fine line can be reproduced successfully.

Regarding claims 6, 7, and 15, Misaka teaches a photomask with a transparent substrate in which mask enhancers are placed in regions and phase shifters are placed in regions surrounded by light shielding portions having transparent portions in between regions, the first region being the bottom part of figure 52:b, the second region being the part of figure 52:b that is right to the bottom part, and the third region being the top part

of figure 52:b, and the transparent region is sandwiched between the second and third regions (see abstract and figures 5, 15, and 43 of English translation). Misaka also teaches a varying width of the phase shifters so that the second pattern region has a smaller phase shifter width than the first pattern region and the width of the transparent portion is larger than the a given dimension as well (see figures 28 and 29 as well as paragraphs 0302, 0113 and 0114 of English translation).

Response to Arguments

Applicant's arguments filed 04/27/2009 have been fully considered but they are not persuasive. The applicant argues that the references of Misaka and Ohsaki presented in the office action dated 01/26/2009 do not teach the claimed invention. Specifically, the applicant argues the reference of Ohsaki does not teach the phase shifters being surrounded by light shielding patterns and the varying sizes of the widths of the phase shifters.

The examiner respectfully contends that the references of Misaka and Ohsaki do teach the limitations of the claims in the instant application and the scope of the invention. Misaka teaches phase shifters that are surrounded by light shielding portions (see figures 15B and 44B). Furthermore, with respect to the varying widths and sizes of the phase shifters, a change in size and shape is not patently distinct over the prior art absent persuasive evidence that the particular configuration of the claimed invention is significant. See *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In re Dailey*, 357 F.2d 669, 149 USPQ 47

(CCPA 1966). MPEP 2144.04[R-1]. Both, the instant application and the reference of Misaka do not differ in the result of the inventions and employ a phase shifter and a shielding pattern as a mask enhancer in order to increase the process margin in a photomask. Thus the rejection stands.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RASHID ALAM whose telephone number is (571)270-3959. The examiner can normally be reached on Mon.-Fri. 7:30 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark F. Huff/
Supervisory Patent Examiner, Art Unit 1795

/RASHID ALAM/
Examiner, Art Unit 1795